

### **REMARKS**

As of the filing of the present reply, claims 1-20 were pending in the above-identified US Patent Application.

In the Office Action, the Examiner rejected all of the claims under 35 USC §103 based on U.S. Published Patent Application No. 2003/0150901 to Grossman et al. (Grossman) alone or in combination with U.S. Patent No. 6,153,313 to Rigney et al. (Rigney), U.S. Patent No. 5,482,789 to O'Hara et al. (O'Hara), and/or U.S. Patent No. 5,455,120 to Walston et al. (Walston). In the present reply, Applicants have amended the claims as set forth above. More particularly:

The preambles of independent claims 1 and 15 have been amended to recite the invention as being directed to a process of forming a diffusion aluminide coating and an overlay coating on internal and external surfaces, respectively, of an article, as recited in the bodies of these claims.

Independent claim 1 has been further amended to incorporate the limitations of its dependent claim 5 and a limitation from claim 15, namely, the overlay coating consists essentially of nickel aluminide intermetallic and the additive layer and at least a portion of the diffusion zone of the diffusion coating is removed on the external surface without removing the diffusion

coating on the internal surface of the article.

In view of its limitations being incorporated into its parent claim, dependent claim 5 has been amended to recite a limitation that finds support in Applicant's specification at [0017].

Finally, in view of the amendments to claims 1 and 5, dependent claim 6 has been amended to depend directly from claim 1.

Applicant believes that the above amendments do not present new matter. Favorable reconsideration and allowance of claims 1-20 are respectfully requested in view of the above amendments and the following remarks.

**Rejections based on Grossman alone, Grossman combined with O'Hara, and Grossman combined with Walston**

These rejections, directed to claims 1-5 and 12-14, are believed to be overcome as a result of parent claim 1 being amended to require that the overlay coating is nickel aluminide intermetallic, as originally recited in claim 6 which was rejected solely on the basis of the combination of Grossman and Rigney.

These rejections are also believed to be improper, as they were

based in part on independent claim 1 and its dependent claims being unpatentable over Grossman et al. (Grossman) on the premise that Grossman discloses “an overlay coating is deposited on the exposed surface region.” However, Grossman does not disclose depositing an overlay coating as required by original independent claim 1 (as well as and claim 15), or a coating that “consists essentially of intermetallic phases” as required by original claim 5. The term “overlay coating” is defined and well known in the art. For example, see Applicant’s specification at [0003], [0016] (diffusion coating processes), and [0017] (overlay coating processes), and Grossman at [0030] through [0034] (which only discusses the coating 70 as formed by diffusion coating processes). Other evidence of the difference between overlay and diffusion coatings include U.S. Patent Nos. 6,340,500, 6,482,469, and 7,150,922, the latter of which teaches:

As apparent from their names, overlay and diffusion coatings are distinguishable in terms of the processes by which they are formed and the thickness of the zone of chemical interaction that occurs within the substrate surface beneath the coating. This zone, referred to as a diffusion zone (DZ), results from the interdiffusion between the coating and substrate. The diffusion zone beneath an overlay coating is typically much thinner than the diffusion zone created within a diffusion bond coat. Diffusion aluminide coatings are also distinguished from overlay coatings, in that the former consists of intermetallic

compounds that form as a result of interdiffusion, while the latter can be multi-phase, containing phases such as gamma ( $\gamma$ ) and beta ( $\beta$ ) nickel aluminide structures if the substrate is a nickel-base superalloy.

Column 1, Lines 48-62.

A difference between the diffusion zones of diffusion coatings and overlay coatings is also evidenced from Applicants' Figure 2, which shows the diffusion coating 32 as having an extensive diffusion zone 36 and the overlay coating 24 as essentially lacking a diffusion zone (though some diffusion inherently occurs).

Furthermore, and for unstated reasons, Grossman is clearly directed to depositing a diffusion aluminide coating 70, as evident from Grossman's repeated reference to a "subsequent aluminum-containing coating" 70 that includes a "subsequent-coating additive zone" 72 and a "subsequent-coating diffusion zone" 74, and the description of only diffusion processes for depositing the aluminum-containing coating 70. In addition, Grossman clearly teaches that the subsequent coating 70 has a "subsequent diffusion zone interface 76 [that] is not at the same location as the initial diffusion zone interface 60" of the removed diffusion coating 54, and in fact is well below the initial diffusion zone interface 60 of the removed diffusion coating 54 as

represented in Figure 5.

In view of the above, Applicants believe that the rejections based on Grossman alone or in combination with O'Hara and Walston are overcome. Applicants therefore respectfully request withdrawal of the §103 rejections of claims 1-5 and 12-14.

**Rejections based on Grossman and Rigney, and  
Grossman and Rigney combined with O'Hara or Walston**

Applicants respectfully request reconsideration of these rejections, which were directed to claims 6-11 and 15-20.

As discussed above, Grossman is not directed to a process of forming a diffusion aluminide coating and an overlay coating on internal and external surfaces, respectively, of an article, as now required by the independent claims. Furthermore, Grossman does not deposit an overlay coating, but instead is limited to depositing a diffusion aluminide coating 70, as evident from Grossman's repeated reference to a "subsequent aluminum-containing coating" 70 that includes a "subsequent-coating additive zone" 72 and a "subsequent-coating diffusion zone" 74, and the description of only diffusion processes for depositing the aluminum-containing coating 70.

Finally, Grossman does not disclose or suggest “the step of depositing on at least the external surface a barrier layer prior to forming the diffusion coatings, the barrier layer inhibiting interdiffusion between the diffusion coatings and the wall region” recited in original claims 11 and 20. Nowhere does Grossman discuss a “barrier layer” capable of “inhibiting interdiffusion.”

In view of the above, Applicants believe that the rejections based on the combination of Grossman and Rigney alone or in further combination with O’Hara and Walston are overcome. Applicants therefore also respectfully request withdrawal of the §103 rejections of claims 6-11 and 15-20.

### **Closing**

In view of the above, Applicant believes the claims define patentable novelty over all the references, alone or in combination, of record. It is therefore respectfully requested that this patent application be given favorable reconsideration.

Though the above remarks are primarily limited to certain limitations of the claims, Applicant believes that other limitations of the claims provide additional grounds of patentability over the cited references, and Applicant

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reserves the right to present these additional grounds at a later time if  
necessary.

Should the Examiner have any questions with respect to any matter  
now of record, Applicant's representative may be reached at (219) 462-4999.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Domenica N.S. Hartman". The signature is fluid and cursive, with the first name "Domenica" written in a larger, more prominent script than the last name "Hartman".

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